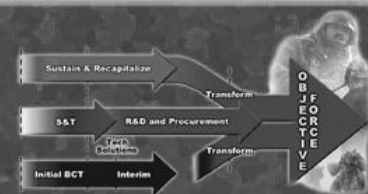




# Missile Technology Drivers For The Future



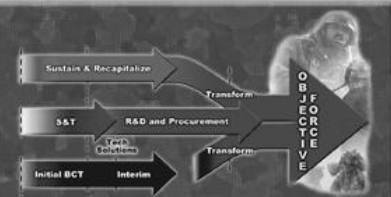
## 2001 MUNITIONS EXECUTIVE SUMMIT

13 FEB 2001



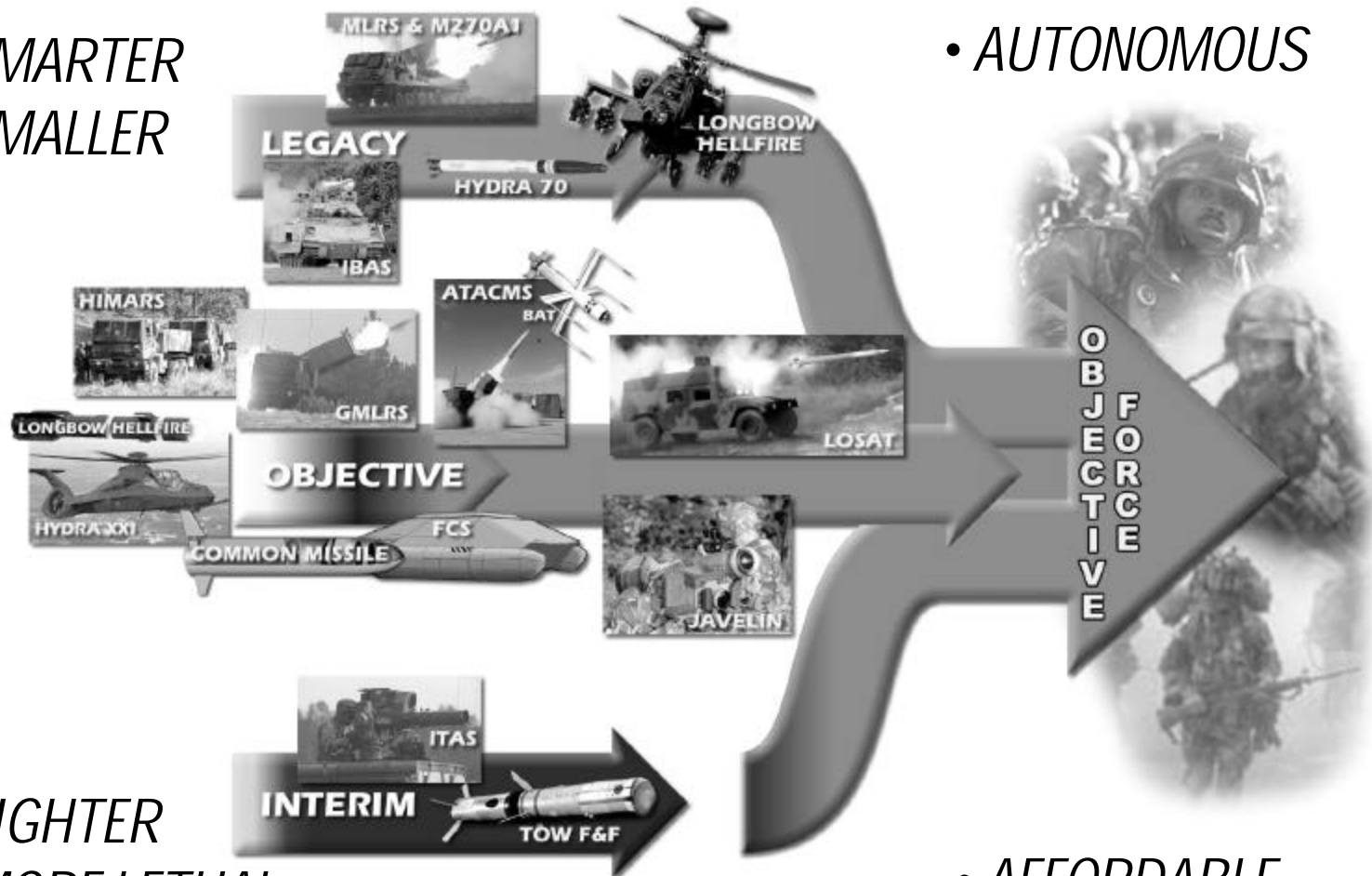
Mr. Don Barker  
Deputy Program Executive Officer,  
Tactical Missiles





- *SMARTER*
- *SMALLER*

- *AUTONOMOUS*



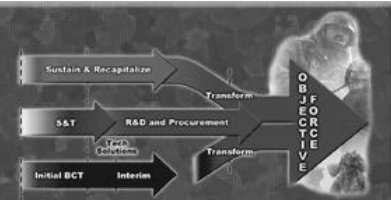
- *LIGHTER*
- *MORE LETHAL*

- *AFFORDABLE*





## *Performance Requirements*

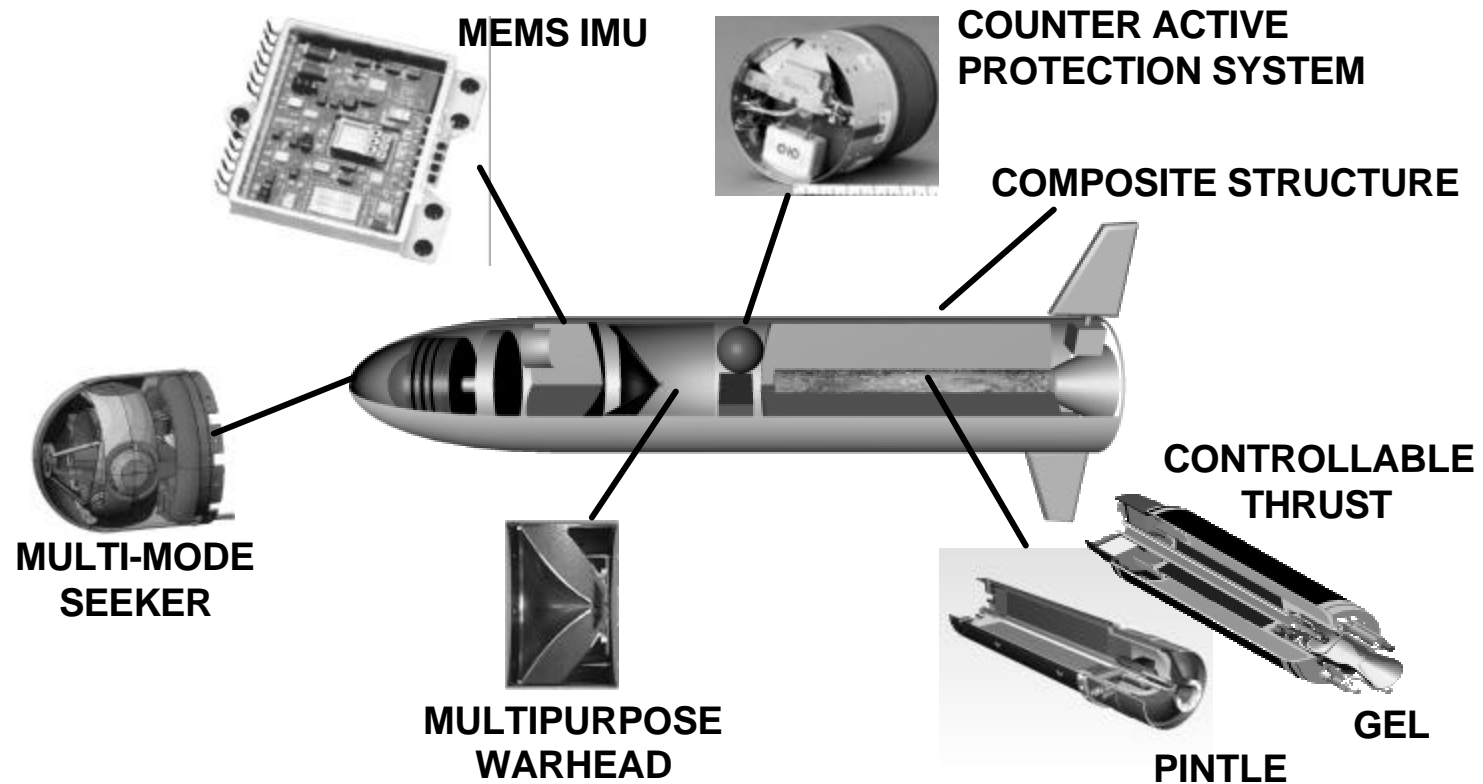
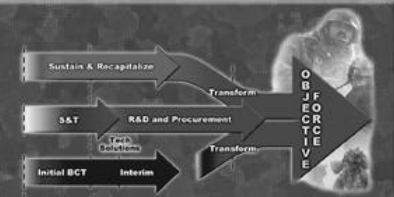


- Defeat T-90 PIP 1, Engage Critical High Value Targets
- Counter Active Protective System
- Day/Night Adverse Weather
- Fire & Forget and Alternate Mode Precision Hit
- Overmatch Lethality
- Increased Standoff Range
- Min Smoke, Insensitive Munition
- ECM Resistant
- Automatic Target Recognition





# Technology Enablers

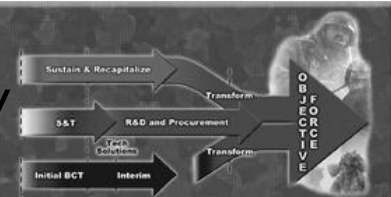


**Leverage Technologies Across  
Government & Industry**

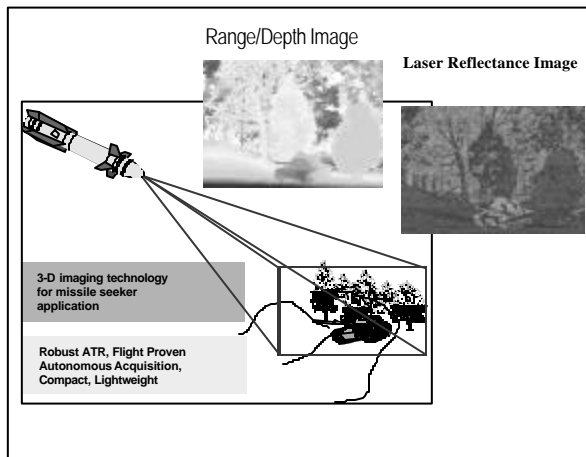




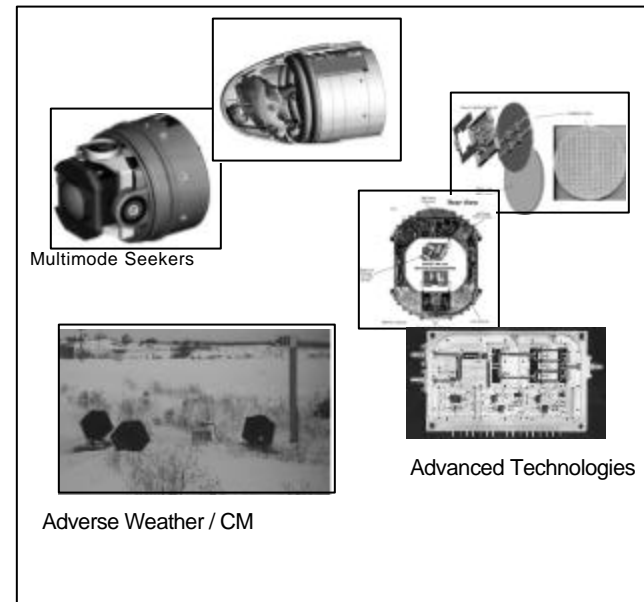
# Multi-Mode Seeker Technology



Increase capability to detect, classify and identify targets in multiple environments and conditions.



**Advanced Autotracker Technology**

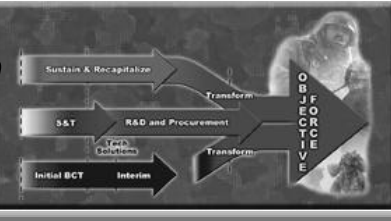


- I<sup>2</sup>R
- RF
- SAL
- LADAR





# Micro-Electromechanical System (MEMS) IMU



- **MEMS** are very small electromechanical devices that can be fabricated in foundries used to make solid state integrated electronic circuits
  - Flywheels, gears, gyroscopes, accelerometers
- **MEMS** provide a potentially inexpensive way to make very small IMUs/INSs for soldier / missile / aircraft applications
  - Leverages electronic industry's economy of scale for price reduction
- Easily integrated into electronic systems

**Accuracy: 1 /hour**



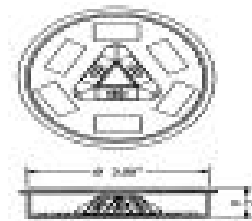
Honeywell HG-1700 RLG IMU

WEIGHT: 2 lbs  
VOLUME: 33 cu in  
POWER: <8 Watts  
COST: \$10 K



Litton LN-200 IFOG IMU

WEIGHT: 1.5 lbs  
VOLUME: 29 cu in  
POWER: 10 Watts  
COST: ~\$10 K



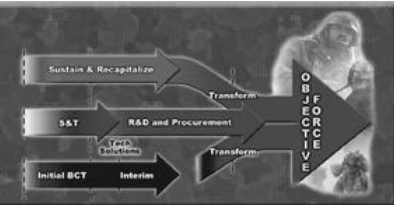
MEMS IMU

WEIGHT: ~0.6 lbs  
VOLUME: <10 cu in  
POWER: 3 Watts  
COST: \$1.2 K





# Controllable Thrust Propulsion



## Vision: Survivable, Controllable Propulsion for Army Missiles

- Multiple targets
- Multiple launch platforms
- Extended range
- Flexible Deployment

## Operational Capabilities

- Weapon system flexibility
- On-the-spot selection of weapon system capability

## Affordability

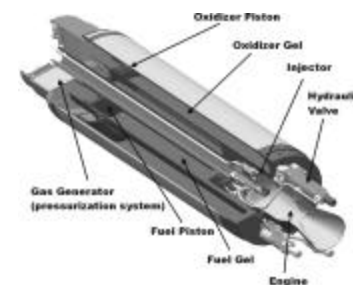
- Reduce the number of systems required for entry forces
- Reduce Army logistics burden (One system for multiple applications)

## Technology Approaches

- **Solids Propulsion – Active or Passive**
  - Variable Area Nozzle
  - Pintle Controlled Solid
  - Less Sensitive Munition



- **Gel BiPropulsion – Active Control**
  - Face Shutoff Engine (FMTI)
  - Vortex Engine
  - Low Toxicity Fuels
  - Inherently IM

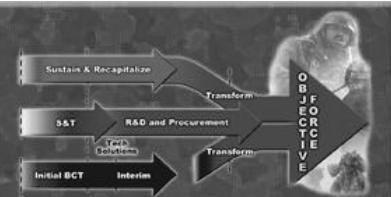


***Provides Propulsion Technology for a New Class of Weapon Systems***

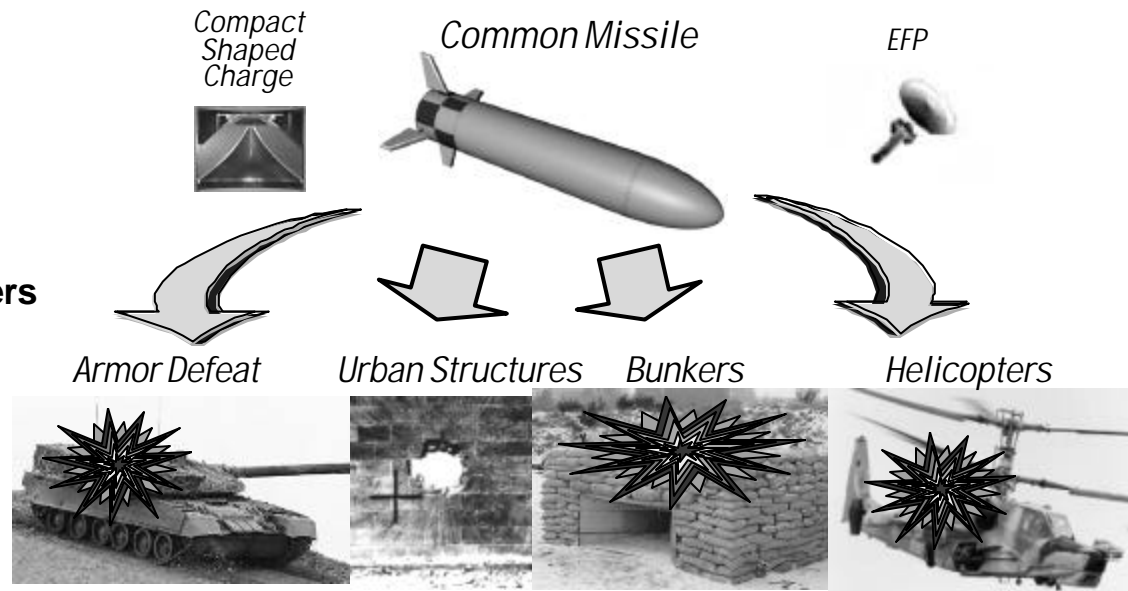




# Multi-purpose Warheads



- **Advanced technology for:**
- **Lighter compact SC anti-armor warheads, 50% shorter with current or better anti-armor performance.**
- **Multi-purpose capability against armor, bunkers, urban targets (masonry walls etc.), helicopters and personnel targets.**
- **Increased performance by advanced EFP warheads for high performance (25% or greater penetration increase) against armor**

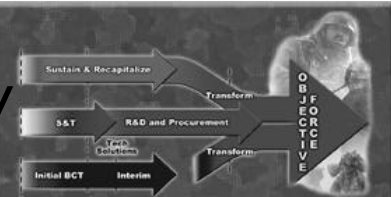


- **Payoff:**
- **Increased maneuverability and range of munitions**
- **Increased munitions lethality over a broader spectrum of targets**
- **Lighter munitions, less required munitions, faster deployment**





# Hypervelocity Technology

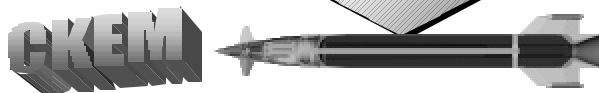


**THE CHALLENGE:**  
*The next generation KE missile must be small, fast, lethal and maneuverable.*

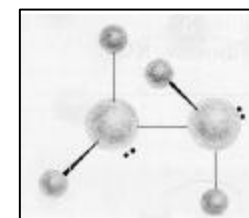


Length 117 in.  
 Weight 175 lb.  
 Speed Mach 4  
 Range 1-4 km  
 Dia 6.4 in

**Retain Lethality**



Length 48 in.  
 Weight 50 lb.  
 Speed Mach 6.5+  
 Range .4-5 km  
 Dia ~6.0 in



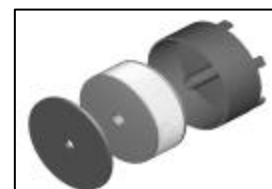
**Advanced Propulsion**



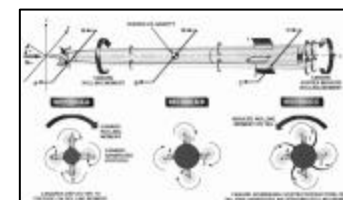
**Control Actuation System Technology**



**Novel Penetrators**



**IMU**



**Aerodynamics**





SMARTER  
SMALLER  
LIGHTER  
MORE LETHAL  
AUTONOMOUS  
AFFORDABLE

